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UMI

THE ELECTROCHEMICAL SOCIETY, INC.

The Electrochemical Society is an international organization of individuals and companies concerned with or interested in Electrochemistry and allied subjects.

The Society is dedicated to the advancement of the theory and practice of Electrochemistry and related subjects, as shown in the following divisions:

Battery	Electro-Organic
Corrosion	Electrothermic
Electric Insulation	Industrial Electrolytic
Electrodeposition	Theoretical Electrochemistry
Electronics	

Among the means to this end are the holding of meetings for the reading and discussion of professional and scientific papers on these subjects, the publication of such papers, discussions, and communications as may seem appropriate, and cooperation with chemical, electrical, and other scientific and technical societies.

It is an incorporated society without capital stock. The affairs of the Society are managed by a Board of Directors under a Constitution and By-Laws. Officers are nominated by a nominating committee appointed by the Board of Directors and elected by the members.

Direct all general correspondence and inquiries regarding membership to Society headquarters at 235 West 102nd Street, New York 25, N. Y., c/o Mr. W. J. Holian, Assistant Secretary.

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Editorial

Benjamin Thompson, Patron of Science

IN FEBRUARY, this column carried a tribute to Michael Faraday, whose name is well-known to all the scientific world. Less well-known is the American-born scientist and man-of-the-world, Benjamin Thompson, later Count Rumford, who founded the Royal Institution of Great Britain where Faraday's work was conducted. It was Count Rumford who employed Humphry Davy, the latter, in turn, employing Faraday as his capable assistant.

Count Rumford, in 1798, had just returned from Munich where he accomplished great things as a diplomat, as a leader of social reform in dealing with the poor, as architect of the famed English Gardens, and as a major contributor to the kinetic theory of heat and many other scientific subjects. His organizing ability was now turned toward England. He was anxious to establish an institution of some consequence where research might be done and which would be applied to the public good in as short a time as possible. Included in the plan was a museum where one might see on display the latest stoves, cooking utensils, chimneys, carriages, etc., designed to increase comfort or economy.

In due course, the Royal Institution was established through public conscription, with Count Rumford the major guide of policy and management. Thomas Young became the first professor of Natural Philosophy and editor of the Institution Journals. Count Rumford interviewed Humphry Davy for the position of Assistant Professor of Chemistry, but was not impressed by Davy's appearance, Davy having apparently appeared for the interview in the same clothes that he wore in the laboratory. Rumford, however, was persuaded to consider him further, whereupon a private lecture was arranged in one of the smaller lecture halls. Davy did so well that the Count immediately ordered: "Let him command any arrangement which the Institution can afford." He, furthermore, thought well enough of the young man to help him buy some used furniture for the living quarters supplied as part of Davy's salary, and collaborated in the design of a modified Voltaic pile, which was the subject of Davy's first paper after joining the Royal Institution. The Count had the pleasure of seeing the Royal Institution become a major factor in the growth of science during the latter 1700's and early 1800's.

The man largely responsible for all this was born in Woburn, Massachusetts, a few miles outside of Boston, on March 26, 1753. Apparently not well suited to farming, he was apprenticed to an importer of British goods in Salem, followed by a similar apprenticeship in Boston. He acquired an informal education as circumstances permitted, and through an early interest in the sciences succeeded in attending a few odd lectures in chemistry given by Professor Winthrop of Harvard. He was not an alumnus of Harvard,

(*Continued on next page*)

contrary to statements made by some of his biographers. He later made himself eligible for teaching elementary school and received a post at Concord, New Hamphire. It was there, at the age of 19 years, that he met and married a wealthy widow, 33 years of age, who gave him his start in life.

Through his wife, he came to know Governor Wentworth of New Hampshire, by whom he was commissioned to the rank of Major in the militia. From this point on, he apparently sided with the British in the growing struggle between the colonies and the mother country. Evidence has come to light only recently that he was employed by General Gage in Boston as an informer for the British troops during the hectic days following the battle of Lexington and Concord. It was quite natural that he left with the British when they evacuated Boston on March 24, 1776. His services to the British in Boston and, subsequently, at the home office of the Military, were rewarded by rapid advance to the appointment of Under-Secretary of State for the American Colonies, under Lord Germaine. During this time his experiments with gunpowder brought him an introduction to Sir Joseph Banks, President of the Royal Society, who arranged for his election as a member when Thompson was only 26 years of age. Subsequently, Thompson commanded a regiment of British sympathizers against the colonists, being stationed first at Charleston, South Carolina, and later at Huntington, Long Island.

After the war, Thompson traveled on the continent and met the Elector of Bavaria, who became his close friend and benefactor. It was at Munich, under the Elector, that Thompson found so much opportunity for applying his wide variety of ideas in many fields of activity. As a result, he was made a Count of the Holy Roman Empire, choosing for his title the original name of the town where he first got his start, namely, Rumford, Massachusetts, now called Concord, New Hampshire.

Count Rumford never revisited his native country, although he expressed an interest in doing so several times. After the Royal Institution was well under way, he took up residence in France and married the widow of Lavoisier, the famous French chemist. His first wife had died in this country some years before. When Sir Humphry Davy made a tour of Europe with Michael Faraday in 1813, he made a point of looking up his old employer at his home near Paris. The Count died in 1814, providing in his will that his gold watch should be left to Sir Humphry Davy "as a token of my esteem."

Except for the happen-stance of Rumford's first marriage and his accompanying political affiliations, one might wonder whether he would not have contributed substantially to social and scientific progress in this country. His loyalties were centered largely in Munich and in England, but, nevertheless, he did not forget his native country. In 1796, he provided $5,000 to the American Academy of Sciences for awarding a medal recognizing outstanding contributions in the field of heat and light. This sum, which accumulated interest many times the original grant, is used today to provide not only the Rumford medal, but also to support fundamental research. The residue of Rumford's estate was left to Harvard University for establishing what is now called the Rumford Professorship.

Rumford's influence on the progress of science, direct and indirect, ranks high indeed.

Current Affairs

Norman Hackerman Succeeds Harold Read As Technical Editor

Last December, the Board of Directors reluctantly voted to accept the resignation of Dr. Harold J. Read as Technical Editor of the JOURNAL. He will be succeeded by Professor Norman Hacherman of the University of Texas. Dr. Read took over Chairmanship of the Publication Committee in October 1948 from Dr. Oliver W. Storey. With the reorganization of the Publication Staff, Dr. Read became the first Technical Editor of the JOURNAL.

HAROLD J. READ

Dr. Read was responsible for the review of the more than 100 manuscripts submitted each year. He performed his duties with exceptional diligence and distinction. In addition to arranging for review by the appropriate divisional representative, he read personally each of the many manuscripts which passed through his hands. His sound judgment and wise counsel have contributed greatly to the steady improvement in the technical standards of our JOURNAL. The pressure of other work finally made it impossible for him to continue giving the large amount of time necessary to the job. It is with sincere regret and gratitude for his contributions, that the Society sees him relinquish his position on the staff of the JOURNAL.

Dr. Read was born in Dubuque, Iowa, in 1911. After primary and secondary school education in Illinois he entered the University of Illinois from which he graduated in 1934 with a degree of Bachelor of Science in Liberal Arts and Sciences. A Master's degree in chemistry followed in 1935. His thesis was done under the supervision of Dr. Sherlock Swann. Dr. Read entered the University of Pennsylvania in 1935 as instructor and graduate student. He received his Ph.D. degree in Physical Chemistry in 1939 with a dissertation on semipermeable silver membranes which was published in the Society's TRANSACTIONS. From 1940–45 he was engaged in industrial research at the Mellon Institute.

Dr. Read became a member of the faculty of Pennsylvania State College in 1945 where he has been teaching various subjects concerned with metallurgy, corrosion, and metal finishing.

Dr. Hackerman comes to us well qualified for his new duties as Technical Editor. He carries with him our confidence that the high publication standards, for which Dr. Read was to such a large extent responsible, will continue.

Dr. Hackerman was born in Baltimore, Maryland, in 1912 where he attended the public schools. He entered Johns Hopkins University in 1928, majored in chemistry and graduated in 1932 with an A.B. degree. He received his Ph.D. in Chemistry from the same University in 1935, working under Dr. W. A. Patrick. His thesis was concerned with the molecular composition of sulfur monochloride in various solvents. Even at this time his major interest was in electrochemical problems, especially with respect to the nature of solid-fluid interfaces. This was reflected in work on the electrokinetic potentials of silica gel in salt solutions.

After graduation he was an instructor at Johns Hopkins and taught physical chemistry at Loyola College in Baltimore, concurrently working as research chemist for the Colloid Corporation of Baltimore. In 1940 his work as Assistant Chemist at the Coast Guard Laboratory at Staten Island led to research in corrosion.

From 1941–44 he continued his corrosion research as Assistant Professor of Chemistry at Virginia Polytechnic Institute. During 1944–45 he was associated with the Manhattan Project as

NORMAN HACKERMAN

research chemist for the Kellex Corporation. Since 1945 he has been at the University of Texas where he is now Associate Professor of Chemistry and Director of the Corrosion Research Laboratory, teaching courses and directing research in electrochemistry, surface phenomena, and colloid chemistry. Many papers of Dr. Hackerman and his students have appeared in the JOURNAL.

He finds little opportunity on the plains of Texas for his favorite hobby, mountain climbing, but looks forward to a well-deserved vacation sometime soon which will take him and his family to the Tetons, the Wind River Range, and other high peaks.

UMI

Review Committee Appointments

Dr. Abner Brenner of the National Bureau of Standards, Washington, D. C., has been appointed a member of the Review Committee of the JOURNAL, representing the Electrodeposition Division of The Electrochemical Society, replacing Dr. Charles L. Faust. At the same time Dr. W. D. Roberston of the Institute of Metals of the University of Chicago was appointed to the Review Committee as representative for the Theoretical Division, replacing Dr. Edward B. Sanigar.

Battery Conference of Signal Corps, May 23–24

The Fourth Annual Battery Research and Development Conference to be sponsored by the Power Sources Branch, Signal Corps Engineering Laboratories, Fort Monmouth, New Jersey, will be held at the Berkeley-Carteret Hotel, Asbury Park, New Jersey, May 23 and 24, 1950.

At this conference, the results of Signal Corps battery research and development during the past year will be presented to the battery industry. The program includes reports on the work on low temperature batteries, battery components, special purpose batteries, research on electrochemical systems for use in battery power supplies, mechanical rectifiers, and other work.

On the lighter side will be two luncheons and an informal dinner for the conferees.

This conference has become, in the four years of its existence, one of the largest in the battery industry. Due to the restricted nature of the material discussed, attendance is by invitation only.

New Magnesium Sheet Division for ALCOA

The Aluminum Company of America plans to establish a new division at its New Kensington, Pennsylvania, plant for the rolling of magnesium sheet, the company recently announced.

Reason for this new division, ALCOA states, is the greatly increased demand for magnesium sheet in airplane construction and other phases of the national security program. This operation was conducted at the New Kensington works during the war but was discontinued when the demand dropped.

The opening of the new division is expected to provide jobs for about 100 additional people at New Kensington.

Allied Research Buys Hoffman Company

Allied Research Products, Inc., Baltimore, recently purchased the R. A. Hoffman Chemical Company, Cleveland. The purchase was part of an expansion program to increase the company's line of metal finishing chemicals. R. A. Hoffman, formerly owner of the Hoffman Company, has joined Allied Research and will be in charge of the development of new types of organic finishes.

Gordon Research Conferences at Colby

The Gordon Research Conferences, sponsored by the American Association for the Advancement of Science, for 1950, will be held from June 26th to September 1st at the Colby Junior College, New London, New Hampshire.

The Conferences were established to stimulate research in universities, research foundations and industrial laboratories. This is achieved by informal meetings consisting of scheduled lectures and free discussion groups. The purpose of the program is not to review the known fields of chemistry, but primarily to bring experts up to date as to the latest developments, analyze the significance of these developments, and to provoke suggestions as to underlying theories and profitable methods of approach for making new progress.

Meetings are held in the morning from 9:00 A.M. to 12:00 Noon and in the evening from 7:30 to 10:00 P.M., Monday through Friday, with the exception of Friday evening. The afternoons are available for recreation, reading, resting, or participation in discussion groups as the individual desires.

Those interested in attending the Conferences should send in their applications on or before May 10th. The applicant should state the institution or company with which he is connected, and the type of work in which he is interested. Address to W. George Parks, Director, Department of Chemistry, Rhode Island State College, Kingston, Rhode Island.

The programs for the Conferences on "Chemistry and Physics of Metals" and "Corrosion" are given below:

CHEMISTRY AND PHYSICS OF METALS

The Metallic Bond

EARL A. GULBRANSEN, *Chairman*

July 3

S. DUSHMAN—Atom Bonds in Metals
Speaker to be announced—Solid State Theory and Metallic Binding
D. HARKER—Some Theories of Intermetallic Chemistry

July 4

D. P. SHOEMAKER—The Crystal Structure of Some Intermetallic Compounds
L. BREWER—Bonding in Semi-metals
R. E. RUNDLE—Bonding in Interstitial Compounds

July 5

C. WAGNER—The Relationship between Measurable Thermodynamic Properties and Theories of the Solid State
E. WALLACE—Experimental Methods for Evaluating Cohesive Energies, Free Energies and Residual Entropies of Simple Alloys as Illustrated by the Mg-Cd System
D. P. SMITH, presented by G. DERGE—The Distribution and State of Hydrogen in Metals and Certain Inferences
C. G. SHULL—Neutron Diffraction Studies in Relation to Solid Structure

July 6

H. B. HUNTINGTON—Metallic Binding near Surfaces and Lattice Defects Speaker to be announced—Relationships between Elastic Constants and the Effect of Pressure and Metallic Binding
C. H. SHAW—A Survey of X-Ray Studies on the Electronic Band Structure of Metals

July 7

R. SPEISER AND J. W. SPRETNAK—Theoretical Predictions of Binary Phase Diagrams

CORROSION

Electrical Measurements in Corrosion

NORMAN HACKERMAN, *Chairman*
F. W. FINK, *Vice-Chairman*

July 24

H. H. UHLIG—Contact Potentials
D. MACGILLAVRY, JR.—Metal-Solution Interface Potentials

July 25

W. D. ROBERTSON—Double Layer Capacity at an Electrode
A. J. DEBETHUNE—Overvoltage

July 26

R. H. BROWN—Polarization
F. L. LAQUE—Polarization in Flowing Solutions

July 27

H. D. HOLLER—Potentials of Galvanic Couples
K. G. COMPTON—Potentials of Coated and Inhibited Metals

July 28

J. M. PEARSON—Summation: The Working Electrode in Corrosion Processes

NACE Whitney and Speller Awards Go to R. H. Brown and O. C. Mudd

Robert H. Brown, Chief of Chemical Metallurgy at the Research Laboratories of Aluminum Company of America in New Kensington, Pennsylvania, has been chosen by the National Association of Corrosion Engineers to receive the Whitney Award for 1950. It was presented to Mr. Brown "in recognition of his outstanding contributions to the science of corrosion."

Mr. Brown holds many patents related to his field and is the author of numerous articles on corrosion. He was a pioneer in establishing the theory of cathodic protection and is an authority on the use of aluminum in specific environments. He has been associated with ALCOA since 1931.

O. C. Mudd, Senior Corrosion Engineer, Shell Pipe Line Corporation, Houston, Texas, has been selected to recieve the 1950 Speller Award for his achievements in corrosion engineering. Mr. Mudd has been engaged in corrosion work for about 17 years and is one of the founders of NACE.

Both awards will be presented during the annual 1950 convention of NACE in St. Louis.

The awards were named for their first recipients in 1947: Willis R. Whitney and Frank N. Speller. The Whitney Award has since been received by Ulick R. Evans, 1948; R. B. Mears, 1949; and the Speller Award by John M. Pearson, 1948; F. L. LaQue, 1949.

Electrochemical Thermodynamics and Kinetics Meeting in Milan

The following tentative program has been announced for the second meeting of the Committee of Electrochemical Thermodynamics and Kinetics to be held at Milan, Italy, September 18–21, of this year. Professor R. Piontelli, Politecnico di Milano, Piazza Leonardo de Vinci, 32, Milano (132), Italy, is in charge of the arrangements. President of the Committee is Professor P. Van Rysselberghe, University of Oregon, Eugene, Oregon, and the Secretary is Dr. M. Pourbaix, University of Brussels, Belgium.

Tentative General Program

1. Introduction.
2. Report on the activities of the Committee.
3. Electrochemical nomenclature and definitions: (*a*) Potentials, signs and definitions; (*b*) Overvoltages, signs and definitions; (*c*) Miscellaneous.
4. Electrochemical behavior of metals and nonmetals: (*a*) Potential-pH diagrams and atlas of electrochemical equilibria; (*b*) Electrochemical kinetics and polarization curves.
5. Applications to the study of corrosion: (*a*) General electrochemistry of corrosion; (*b*) Particular cases: Fe, Zn, Pb, Al, etc; (*c*) Passivation, inhibitors, etc.
6. Applications of potential-pH diagrams to general and analytical chemistry.
7. Applications to electrolytic phenomena.
8. Miscellaneous, including organization of Committee.
9. Conclusions, program of work, etc.

The objectives of this recently organized Committee were outlined in the August 1949 issue of the JOURNAL, on page 36*C*. Additional delegates since the time of this announcement are: F. E. W. Wetmore, Toronto, for Canada; A. B. Winterbottom, Trondheim, for Norway; E. Jimeno, Madrid, for Spain.

PIERRE VAN RYSSELBERGHE

Inquiries should be addressed to P. Van Rysselberghe, Department of Chemistry, University of Oregon, Eugene, Oregon.

Industrial Hygiene Course at Michigan, June 19–21

The University of Michigan School of Public Health at Ann Arbor, Michigan, is offering an Inservice Training Course in Industrial Hygiene and Human Relations for Safety Personnel. This is a three-day course to be held on June 19, 20, and 21, 1950. It was planned with the assistance of a committee of outstanding authorities in industrial and personnel fields.

A brief outline of the course follows:

I. A panel emphasizing the problem of human relationships in plant safety practices.

II. Sanitation—including food facilities, locker rooms, wash rooms, cleansing agents, air sanitation, drinking fountains.

III. Plant Layout—heating, ventilation, lighting, adjustment of equipment (comfort and fatigue as accident and health factors).

IV. Plant Skin Hazards—solvents, dry chemicals, oils, disinfectants, etc.

V. Industrial Health Problems, Part 1—plating, pickling, spraying, sand blasting, heat treating, etc.

VI. Industrial Health Problems, Part 2—poisonous metals, dusts, and gases.

Full details may be obtained upon request to University of Michigan.

Summer Course in Ceramics at M.I.T.

Professor F. H. Norton of the Division of Ceramics, Department of Metallurgy at M.I.T., announces a special two-week summer program in high-temperature ceramics to be held at Massachusetts Institute of Technology from August 7 to 18, 1950. The program includes a series of ten lectures by outstanding authorities in the high-temperature ceramics field and also provides for laboratory experiments. The program will emphasize refractory materials important to combustion parts of guided missiles and to components for atomic energy reactors. The lecturers include F. H. Norton, R. B. Sosman, R. C. Young, P. W. Gilles, Samuel Zerfoss, A. J. Shaler, R. F. Geller, J. T. Norton, L. S. Foster, and W. J. Koshuba.

Applications and requests for further information should be addressed to Professor Gale, Head of the M.I.T. Summer Session, Room 3-107, Massachusetts Institute of Technology, Cambridge 39, Massachusetts.

A. I. Ch. E. Regional Meeting in Houston

The American Institute of Chemical Engineers held its Houston Regional Meeting, February 26–March 1, at Houston, Texas, with headquarters at the Rice Hotel.

A three-day technical program included sessions on "Phase Equilibria," "Waste Disposal and Ultrasonics," "Chlorine-Alkali," "General Technical Program," and "Student Technical Program."

An especially interesting series of plant trips was arranged for the meeting. Included in these were visits to Diamond Alkali Company, Shell Oil Company, Sheffield Steel Corporation, Consolidated Chemical Industries, Inc., Lone Star Cement Corporation, Mathieson Chemical Corporation, Champion Paper and Fibre Company, Humble Oil and Refining Company, and Goodyear Synthetic Rubber Corporation.

James A. Lee, past president of The Electrochemical Society, was Chairman of the Public Relations Committee for the meeting.

* * *

The next Regional Meeting of the A. I. Ch. E. will be the Boston Meeting, held at the New Ocean House, Swampscott, Massachusetts, May 28–31. This meeting will feature symposia on Ultrasonic Energy and Fluidized Powder Reactions. Mr. J. J. Healy, Jr., of Monsanto Chemical Company is Chairman of the General Committee of this meeting.

Great Lakes Carbon a Sustaining Member

The Society is glad to welcome as a new sustaining member, the Electrode Division of the Great Lakes Carbon Corporation.

The Electrode Division is well known for its production of Anodes and Electrodes, having supplied them for over ten years. Two plants, one at Niagara Falls, New York, and the other at Morgantown, North Carolina, are strategically situated to serve the interests of the chemical field with these products.

The Company maintains in addition to plant control laboratories, a modern well equipped research center at Morton Grove, Illinois. On its staff of eminent chemists, physicists, and research technicians are men who are highly specialized in carbon and graphite research.

SECTION NEWS

Chicago Section

The Chicago Section held its regular meeting on March 3rd at the Chicago Engineers' Club. On this occasion Dr. A. L. Ferguson, President of the Society, and Professor of Chemistry at the University of Michigan, presented an extensive lecture on the recent developments in the field of "Polarization and Overvoltage."

In his talk, Dr. Ferguson concisely developed the basic conceptions of electrode potential and its interrelation with ion activity. In the development of polarization and overvoltage definitions, the speaker stressed the difference between IR drop and active potential as overvoltage.

The use of the Haring Cell was next discussed with the several points of difference in its application being fully explained. Dr. Ferguson then went on to describe the Haring Cell now in test at the University of Michigan, which encompasses the theories of the several methods of reference electrode location. This work, while not complete, appears to be very enlightening on the theory behind anode and cathode overvoltage.

A comparison of the results from the commutator method and the direct method disclosed that there is considerable difference in the results from the two methods.

The speaker next discussed the work of Holler and Newbery and its implication on overvoltage measurements. The work at the University of Michigan with a new super sensitive oscillograph discloses that there is considerable variance in results obtained by the speaker and the earlier work of Holler and Newbery.

Dr. Ferguson went on to stress the importance of testing all equipment to see that it is giving accurate, reproducible results before great reliance is placed on results. In perfecting the new oscillograph, many months were spent in developing and testing the apparatus for this effect. After establishing the point that overvoltage is totally separate from IR drop, Dr. Ferguson evolved his theory of "Equilibrium Potential and Overvoltage Based on Atomic Hydrogen."

J. H. Conolly, *Secretary*

Cleveland Section

The Cleveland Section held its last regular local meeting, before the Spring Meeting of the Society, on March 14th, at the Cleveland Engineering Society.

Mr. George F. Geiger, Metallurgist, of the International Nickel Company, Inc., New York, addressed the Section on the subject "The Properties and Uses of Metals and Alloys for High Temperature Applications." Mr. Geiger used a large number of slides to illustrate his talk and to show some of the compositions and characteristics of alloys that are suitable for high temperature applications, as well as the different shapes in which alloy castings are commercially available.

Limitations as to temperature resistance in different atmospheres (oxidizing, neutral, or reducing) were pointed out, with special emphasis on carburizing, nitriding, and sulfur containing atmospheres.

Because of the Spring Meeting of the Society in Cleveland during April, no Section meeting has been planned for that month.

H. C. Froelich, *Secretary*

Detroit Section

Dr. A. E. Remick of the Chemical Department, Wayne University, Detroit, was the guest speaker at the February 17th meeting of the Detroit Section held at Wayne University.

"Alternating Current Electrolysis" was the subject of Dr. Remick's discussion, one of the interesting features of which was his presentation of some unpublished capacitance measurements on several alternating current cells and some conclusions as to the nature of the alternating current cell as deduced from these measurements.

In his opening remarks Dr. Remick pointed out that the alternating current cell has reactive characteristics as well as resistance characteristics and, therefore, has capacitance polarization as well as resistance polarization, both of which show dispersion effects, i.e., vary with current density.

Measurements of capacitance with variation in current density gave a curve with an initial relatively flat portion which showed a sharp increase in capacitance as current density was raised. Dr. Remick attributed this capacitance elevation point (CEP) to the starting of the electrolysis of water. Variations in frequency over a wide range affected the position of the capacitance vs. current density but not the nature of the curve.

The speaker interpreted the alternating current cell as composed of the physical double layer capacitance com-

mon to both a-c and d-c cells and the pseudo-capacitance due to chemical reaction typical of the alternating current cells. Data on cells with the following electrolytes were presented:

$M/10$ $FeSO_4$ plus $M/10$ $Fe_2(SO_4)_3$ in $M/2$ H_2SO_4

Glycerol saturated with KI

$M/2$ H_2SO_4 plus capryl alcohol

$3M$ H_2SO_4

This concluded the very informative talk.

Corrosion Symposium

A Corrosion Symposium was the special feature arranged by the Detroit

C. F. Nixon

Section at its March 17th meeting, held at Wayne University.

Taking part in this symposium was Mr. C. F. Nixon, Ternstedt Division, General Motors Corporation; W. D. McMaster, General Motors Research Laboratories; and Walter Piper, The Detroit Edison Company, all of Detroit.

* * *

Mr. Nixon opened the discussion with a talk on the testing of plated metals. He observed that there is no adequate accelerated test for determining the corrosion resistance of plated metals. The salt spray test has been the most widely used and Mr. Nixon discussed this test in some detail outlining the work done by the A. S. T. M. in attempting to standardize the test. Mr. Nixon also reviewed briefly the Ferroxyl test and the hot water test as a means of detecting porosity in a plated coating.

The speaker also presented data on atmospheric corrosion tests, particularly in Detroit and on the Florida seacoast. On plated metals, he said, more rapid failure is encountered in the Detroit industrial atmosphere than in the seacoast atmosphere. Mr. Nixon felt that there was a great deal to be learned by microscopic study of the very early stages of failure in both accelerated corrosion tests and atmospheric corrosion tests. Mr. Nixon cited the conclusions of Dr. Blum in relation to the corrosion resistance of chromium plated metals, namely that the corrosion resistance is directly related to the thickness of the nickel plate and that the presence of a layer of copper beneath the nickel reduces the corrosion resistance.

* * *

Mr. McMaster discussed the testing of painted coatings. He outlined the tests used as: (1) Film thickness, (2) Adhesion of the paint film, (3) Flexibility, (4) Rust creepage, (5) Cold cracking, (6) Chalking, (7) Porosity, (8) Water resistance, (9) Moisture resistance, (10) Abrasion resistance, (11)

W. D. McMaster

Acid resistance, (12) Atmospheric exposure tests, (13) Salt spray, (14) Weatherometer.

In relation to film thickness Mr. McMaster stated that a 2–3 mil thickness of paint is required for adequate protection. Coatings 0.5 mil in thickness are practically worthless from a corrosion standpoint and heavier coatings may cause other difficulties. Mr. McMaster has found the South Florida atmosphere to be the most satisfactory of the atmospheres for determining the corrosion resistance of paint, probably because of the maximum amount of sunlight at this site. Mr. McMaster has found a solution containing 5 per cent salt more corrosive to paint films than 20 per cent salt solution in the accelerated salt spray corrosion test.

* * *

Mr. Piper described an accelerated corrosion test being investigated by the Detroit Edison Company. In this test the specimens are exposed alternately to a finely atomized spray of N/100 NaCl and N/100 H_2SO_4 and to ultraviolet light. The ultraviolet light completely dries the specimens between exposures to the corrosive solution. Mr. Piper reported data on steels of different copper content comparing corrosion rate by this test with atmospheric corrosion

Walter Piper

in Detroit. Using this test on a nine-hour-day basis it was found that an acceleration of four times atmospheric corrosion rate was obtained.

M. L. Baty, *Secretary-Treasurer*

Niagara Falls Section

President Ferguson visited the Niagara Falls Section where he addressed a group of approximately 60 members and guests at a dinner and meeting held March 8th at the Red Coach Inn, Niagara Falls, New York.

Dr. Ferguson followed up a discussion on "Polarization and Overvoltage," initiated at a meeting of the Section two years ago, with a further review of work done at the University of Michigan on this subject.

The long-term nature of the studies was emphasized by Dr. Ferguson. These studies were initiated more than 30 years ago and major phases of the investigation have each required approximately 10 years. This painstaking work by Dr. Ferguson and his associates has established several fundamental con-

cepts which are the basis for a proper understanding of electrolytic phenomena.

Preceding the talk by Dr. Ferguson, the annual business meeting and election of officers was held with Raymond G. Brown, Chairman, presiding. The officers elected for the year 1950–51 are:

Chairman: Marvin J. Udy, Consulting Engineer.

Vice-Chairman: Allen G. Gray, E. I. duPont de Nemours & Co., Inc.

Secretary-Treasurer: Morton S. Kircher, Hooker Electrochemical Co.

M. S. Kircher, *Secretary-Treasurer*

Philadelphia Section

A meeting of the Philadelphia Section of the Society was held March 1st, in the Harrison Laboratory, University of Pennsylvania, jointly with the Philadelphia Branch of the Electroplaters' Society. A dinner at the Lido Restaurant in honor of the speaker, Electrochemical Society President Alfred L. Ferguson, preceded the meeting. Forty-five members and guests attended the dinner and about 120 attended the meeting.

During the business meeting Chairman Arthur Osol appointed the following nominating committee to report at the May meeting: Homer Cherry, Chairman, Harry Alsentzer, Albert Ware.

Dr. Ferguson, Head of the Department of Electrochemistry at the University of Michigan, discussed a field of his research, "Polarization and Overvoltage." It was an extensive and authoritative coverage of a subject of keen interest to the joint assembly. Salient points are given below:

There is no electrochemical process in which overvoltage or polarization is not encountered. Some industries have to avoid these effects as much as possible, while others are based on the fact that they occur.

There are still many basic unsolved problems in electrochemical theory, such as: why is a potential created when a metal goes into solution, what part do solvent molecules play in determining deposition potential, and what are the forces playing a part in the establishing of an equilibrium potential at the interface between a metal and a solution.

Increase in current density always increases overvoltage, while increase in temperature decreases it. If a salt is added which forms a complex with the metallic ion in the solution, the potential will be changed because the concentration of metal ion has been decreased by formation of the complex ion. Agitation reduces overvoltage and aids in good electrode deposition.

Inside all metals the equilibrium (for Cu for example $Cu \rightleftharpoons Cu^{++} + 2e$) is set up between atoms and ions. When the metal is placed in a solution of its ions, the relative tendencies for ions to leave the metal and go into solution and for ions to leave the solution and go into the metal determines the potential of the system.

Overvoltage is simply positive polarization, an increase in the normal electrode potential as a result of passage of current. IR drop should never be included under overvoltage or polarization.

In measuring polarization potential most experimenters have the reference electrode make contact on the inside of the electrode to be measured. At the University of Michigan it was shown that this method cannot be accurate. Therefore, they have the reference electrode make contact on the outside of the electrode to be measured.

In attempting to solve the problems of the difference between the direct and commutator methods of measuring polarization and Newbury's transfer resistance theory, use was made of a super-supersensitive oscillograph. These experiments showed definitely that there is *no* IR drop at any metal electrode, and that Newbury's theory of transfer resistance is in error.

J. F. Hazel, *Secretary*

Pittsburgh Section

On March 2nd, the Pittsburgh Section enjoyed hearing Dr. Alfred L. Ferguson, President of the Society, speak on Electrochemical Reactions and the basic principles involved in "Polarization and Overvoltage" studies. Dr. Ferguson gave an extremely clear definition of the basic points before he proceded to outline the pertinent history and thinking in the various researches on polarization which have been conducted at the University of Michigan along with the history of parallel researches elsewhere.

Dr. Ferguson's talk was so well received that everyone regretted there was not more time for continuing such an active and enlightening discussion.

A small dinner meeting preceded the technical part of the program. At this meeting a lively discussion resulted in some new thoughts for obtaining increased membership and wider activities for the Society.

In spite of severe weather, about half of the active members of the Section were present.

E. K. Camp, *Secretary-Treasurer*

San Francisco Section

The March 15 meeting of the San Francisco Section was held at the Faculty Club on the campus of the University of California in Berkeley, California.

At the business meeting, the following nominations were presented by the Nominating Committee:

Chairman: Edward B. Sanigar, Naval Radiological Defense Laboratory, San Francisco Naval Shipyards

Vice-Chairman: Charles G. Maier, Consulting Engineer

Secretary-Treasurer: Richard F. Bechtold, The Dow Chemical Company

The guest speaker of the evening was Mr. H. F. Myers, of the Metallurgical Department of the Pittsburg Works of the Columbia Steel Company, Pittsburg, California. He spoke on the subject "Electroplating Tin."

Mr. Myers first explained the early history and background work that has led to the present processes for coating steel with tin. The "hot-dip" method of tin plating in which the piece of steel to be coated is dipped into a bath of molten tin and then cooled has long been the standard tinplating process. It is essentially a batch process and all attempts to make it continuous ran into considerable difficulty. Because of this the advantages inherent in a continuous process were not able to be utilized fully until a satisfactory electroplating process was developed. This did not occur until 1937 when the Carnegie-Illinois Steel Company put the first commercial tin electroplating line into operation.

In 1941–42, when World War II resulted in a tight tin conservation program, such impetus was added to the electroplating process that 30 installations were either in operation or under construction by this time. The fact that 1¼ lb of tin per base box is the minimum that can be applied by the hot-dip method as compared to a standard of 2 lb per base box which can be maintained with the electroplating process made the desirability of the latter method quite evident during a period when the supply of tin was limited (A base box is an industrial unit which contains approximately 31,000 sq in. of plated area).

The expansion of the electroplating process can be illustrated with the

figures for tin plate production for 1941 and 1947. In 1941 the amount of electrolytic tin plate was almost neglible. In 1947, it had surpassed the production of tin plate by the hot-dip method.

Mr. Myers next explained the four principal electrolytic tin plate processes. They are the alkaline stannate process, the acid sulfate process, the halogen process, and the fluoborate process. The large majority of the present installations are about evenly divided between the alkaline stannate and acid sulfate processes. As to which of these two is the more desirable, it is a matter of the economic evaluation of several factors. The alkaline stannate process requires a much larger installation but requires less power and less precise control. The acid sulfate process requires about $\frac{1}{12}$ the installation of the alkaline stannate process, but consumes twice as much power and necessitates very precise controls.

The speaker then discussed the various treatments required both before and after the actual plating operation, the electrochemistry of the process and the variables involved with resultant compromises in process operation and economics, the laboratory methods used for control and development work, and the more recent developments in the field.

Mr. Myers' concluding remark voiced the common thought among the audience at the end of his talk. He stated that the tin cans which are so common to everyone are not just the result of simply putting tin on steel but involve an extremely complicated precise process, the proper operation of which is a real challenge to any modern scientist.

Following the talk, the members and guests were conducted on a very interesting tour of the laboratories of the Chemical Engineering Department at the University of California.

R. F. BECHTOLD, *Secretary-Treasurer*

Future Meetings of The Electrochemical Society

Cleveland, April 19–22, 1950
Buffalo, October 11–14, 1950
Washington, April 8–11, 1951
Detroit, Fall, 1951
Philadelphia, Spring, 1952
Montreal, Fall, 1952

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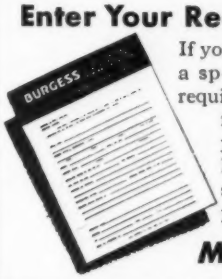

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PERSONALS

A. F. G. CADENHEAD, Director of Chemical Development, Shawinigan Chemicals Limited, is now at the Head Office of the company in Montreal, Canada. Dr. Cadenhead had been for many years at Shawinigan's plant in Shawinigan Falls, Quebec.

V. S. DE BEAUSSET, an Electrochemical Society member employed by the J. G. White Engineering Corporation which formerly had its offices in Shanghai, China, has been in recent months at Taipeh, Taiwan (Formosa), and writes that mail is received there regularly and quickly.

GUSTAF WRANGLEN, formerly of the Division of Applied Electrochemistry, Royal Institute of Technology, Stockholm, Sweden, is now in this country where he is connected with the Electrodeposition Section, National Bureau of Standards, Washington, D. C.

F. W. REUTER, JR., recently accepted a position as Production Manager of the Vacuum Tube Department at the Victoreen Instrument Company, Cleveland, Ohio. Mr. Reuter was previously with the General Electric Company in that city.

A. F. EVANS has been appointed Manager of the Port Kembla Works, in New South Wales, of The Electrolytic Refining and Smelting Company of Australia Pty. Ltd., according to an announcement from the company's head office at Melbourne, Australia. Mr. Evans was formerly Assistant General Superintendent and he succeeds Mr. G. J. Brittingham who has retired from the company's service.

W. D. ROBERSTON, member of the Review Committee representing the Theoretical Division of The Electrochemical Society, has been appointed Assistant Professor of Metallurgy at Yale University. Dr. Robertson is now at the Institute for the Study of Metals, University of Chicago.

RICHARD RIMBACH, President of Gardiner, Robinson, Stierheim & Weis, Inc., Pittsburgh, Pennsylvania, left on March 28th for an extensive trip to England, France, Germany, Belgium, and Switzerland. Mr. Rimbach is also publisher of "Instruments," and manages the National Instrument Exhibit. He will visit a number of European Fairs, making a study of the recent advances in scientific instruments and foreign exhibit techniques.

M. L. HOLT, Professor of Chemistry at the University of Wisconsin, has been granted a leave of absence to join the staff of the Argonne National Laboratory in Chicago. Dr. Holt will return to the University of Wisconsin in September.

RICHARD L. DEMMERLE has accepted a position as Special Features Editor on "Chemical Engineering," McGraw-Hill Publishing Co., Inc., New York City. Mr. Demmerle was previously Associate Editor, in the New York office, of "Chemical and Engineering News" and "Industrial & Engineering Chemistry," American Chemical Society publications.

Dr. Koenig Accepts Post at Stanford

DR. LOUIS KOENIG recently accepted the newly created post of Assistant Director of Research at Stanford Research Institute, Stanford, California. He had formerly been Chairman of Chemistry and Chemical Engineering Research at Armour Research Foundation, Chicago, Illinois.

In his new duties, Dr. Koenig will have full administrative charge of Institute activities in chemistry, chemical engineering, metallurgy, applied biology, food technology, and pharmacology. The office was created to provide better and more extensive service in the field of industrial chemistry.

Dr. Koenig has had wide experience as a research chemist, including nine years with the Alkali Research Division of the Solvay Process Company, Syracuse, New York. He was later chief of the research branch of the U. S. Atomic Energy Commission's Madison Square Area in New York, and assisted in arranging the chemical program for the Brookhaven National Laboratory on Long Island. His work at the Armour Research Foundation followed. Dr. Koenig is a member of a number of leading scientific societies including The Electrochemical Society.

Dr. Christain Aall Honored

DR. CHRISTIAN H. AALL, assistant director of the research department of Monsanto Chemical Company's Phosphate Division, St. Louis, Missouri, has been invited to deliver the Second Castner Memorial Lecture before the Society of Chemical Industry in London and to receive the Castner Gold Medal.

The lectures, commemorating Hamilton Young Castner, are sponsored by Imperial Chemical Industries, of England. Dr. Aall was unanimously selected for his "outstanding ability in the science of chemistry." He has been asked to lecture on Electrothermics and Electrothermal Processes. The date of his lecture has not been decided, but will probably be early in October.

ARTHUR E. GIBBS

ARTHUR E. GIBBS, well-known electrochemist and inventor, died on March 2nd, at Summerville, S. C. He was 74 years old.

Mr. Gibbs was born at Bath, England. After graduating from Bristol University in Chemical Engineering, he came to the United States in 1902 and started his electrochemical career at Niagara Falls. In 1903 he joined the Pennsylvania Salt Manufacturing Company at its Wyandotte, Michigan, plant. He developed the Gibbs cell for the electrolytic production of chlorine, caustic soda, and hydrogen from common salt brine. Later he became head of the Research and Development Department of Pennsalt in Philadelphia and continued in this activity until his retirement in 1946.

Mr. Gibbs had many friends among scientific leaders here and in Europe, and he devoted much time to assisting younger scientists in their careers. He was an active member of The Electrochemical Society, the American Chemical Society, and the Faraday Society.

FUTURE MEETINGS OF OTHER ORGANIZATIONS

NATIONAL FIRE PROTECTION ASSOCIATION, 54th annual meeting, Haddon Hall, Atlantic City, New Jersey, May 15–18

AMERICAN GAS ASSOCIATION, production and chemical conference, Hotel New Yorker, New York City, May 22–24

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, regional meeting, New Ocean House, Swampscott, Massachusetts, May 28–31

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS, 37th spring meeting, Muehlebach Hotel, Kansas City, Missouri, June 4–7

EDISON ELECTRIC INSTITUTE, 18th annual convention, Auditorium, Atlantic City, New Jersey, June 5–7

LETTERS TO THE EDITOR

Der Franklin

Dear Sir:

This is to express my appreciation for the learned and enlightening paper by the eminent Herr Professor Doktor Sol Neman.

DAVID F. FORTNEY
Towanda, Pennsylvania

Bound Volumes

Dear Sir:

It was a pleasure to see the new format of the January issue of the JOURNAL. The change in size is most welcome to librarians faced with a shelving problem.

I would like to suggest that the yearly bound volume include the entire contents of the JOURNAL instead of the Technical Papers Section alone.

I find that articles such as "Review of Articles on Luminescence for 1949" with its rather comprehensive bibliography are not only timely but excellent for future reference.

The Feature Section and Current Affairs are of sufficient interest to us to include in a bound volume for the year. In other words I think that a number of librarians would feel that they should bind the issues of the JOURNAL complete rather than rely on the bound volume having only the technical articles.

LEAH E. SMITH, Librarian
Bell Telephone Laboratories
Murray Hill, New Jersey

Production of Ammonia

Dear Sir:

At the suggestion and under the guidance of Professor Colin G. Fink I began an investigation of the production of ammonia at atmospheric pressure in 1945. I have been unable to devote any time to the investigation since then, and since it appears unlikely that I will be able to continue work on the project in the near future I should like to offer the data so far obtained in the hope that some reader might be able to make use of them.

In the most successful runs, moist nitrogen was passed over magnesium at 650°C to form the nitride. The nitrogen supply was then turned off and moist hydrogen was passed over the hot nitride, ammonia and the hydride being formed. The moisture in the gases was found to be essential. A maximum yield of 0.2 gram of ammonia was obtained with very small scale laboratory equipment.

Before commercial feasibility of the process can be determined, data on the reaction rates and the quenching of the ammonia to prevent its decomposition must be obtained.

The current method of producing ammonia employs the direct reaction of nitrogen and hydrogen in the presence of a catalyst at a pressure of from 300 to 1000 atmospheres, and a temperature of about 475°C.

The attainment of these conditions requires a large investment in very heavy equipment and a great deal of energy for compression. In addition to the economic considerations, the hazards in operating the present plant are considerable.

ROBERT BANKS
Columbia University
New York, N. Y.

RECENT NBS PUBLICATIONS

Copies of the following publications of the National Bureau of Standards may be obtained at listed prices from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Fatigue Characteristics of Electroformed Sheets with and without Iron Backing, Harry K. Herschman and Carroll Thomas, 10 pp., 10 cents (RP2039).

A study of flexural fatigue properties determined for electroformed iron-nickel sheets bonded with either solder or a plastic adhesive to open-hearth iron.

Cathode Heater Compensation as Applied to Degenerative Voltage-Stabilized Direct-Current Power Supplies, Robert C. Ellenwood and Howard E. Sorrows, 5 pp., 10 cents (RP2027).

Discussion of a new method of compensating a degenerative-type voltage stabilizer that simplifies the design of precision stabilized direct-current power supplies.

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NEW MEMBERS

At the meeting of the Executive Committee held on March 8, 1950, at the office of The Electrochemical Society, Inc., 235 West 102nd Street, New York City, the following were elected to membership:

Active Members

STEPHEN EROS, General Electric Co., mailing add: 1353 West 83rd St., Cleveland, Ohio (Electronics)

ARTHUR E. REMICK, Wayne University, Detroit, Michigan (Electro-Organic)

JULIUS TERES, U. S. Air Force, Wright-Patterson A.F. Base, mailing add: 519 N. Williams St., Dayton 7, Ohio (Corrosion)

VICTOR J. TURK, Cleveland Graphite Bronze Co., mailing add: 23211 Lake Shore Blvd., Euclid 23, Ohio (Electrodeposition)

SAMUEL F. WALTON, The Exolon Company, Tonawanda, New York (Electrothermic)

Associate Member

WILLIAM M. KING, Cleveland Graphite Bronze Co., mailing add: 184 Eddy Rd., Cleveland 8, Ohio (Electrodeposition)

Student Associate Member

MILTON STERN, Corrosion Lab., Rm. 8-206, Massachusetts Institute of Technology, Cambridge 39, Massachusetts (Corrosion)

RECENT PATENTS

Selected for electrochemists by Fred. W. Dodson, Chairman of the Patent Committee, from the Official Gazette.

Explanatory notice.—The Official Gazette now publishes abstracts of the disclosures of patent applications when the inventor so requests and also indicates that the application is to be abandoned. Data as to such of these applications as seem to be of interest to members of the Society will appear in the lists of patents. Photocopies of the applications, or any part of them, may be purchased from the Patent Office for 20 cents a sheet, but the Society has no information as to the number of sheets in an application.

December 6, 1949

Oliver, G. F. N., 2,490,598, Tubular Secondary Electric Battery

Bristol, H. R., 2,490,617, Molten Metal Pyrometer Device

Jardine, R., 2,490,630, Storage Battery Plate and Retainer Construction

Nachtman, J. S., 2,490,700, Production of Alloy Coating on Base Metal Material

Dubilier, W., 2,490,730, Device for Electrically Treating Liquids

December 13, 1949

Klingel, G. C., 2,490,817, Immersion Thermocouple

Osterheld, C. M., 2,490,978, Corrosion Prevention

Palmer, R. T., 2,490,979, Electrostatic Precipitator

Zimmerman, R. E., 2,491,021, Steel for Elevated Temperature Service

McGill, E. F. G., 2,491,126, Method of Electroplating on Chromium or Chromium-Iron Alloys

Christen, V. H., 2,491,162, Battery Filler Plug

Mulder, J. G. W., 2,491,199, Photoelectric Cell and Method of Manufacturing It

Rennie, R. F., 2,491,210, Tube Furnace for Producing Metal

Stearns, D. E., 2,491,225, Method of Protecting Subterranean Metallic Structures

Sears, R. W., 2,491,284, Electrode for Electron Discharge Devices and Method of Making the Same

Koontz, P. G., 2,491,320, Neutron Detector and Method of Making Same

Forster, F. T., 2,491,370, Explosion-Proof Vent Plug for Storage Batteries

December 20, 1949

Poland, F. F., 2,491,579, Electric Resistance Furnace

Blake, I. C., Harriss, L. H., and Mullen, J. B., 2,491,640, Deferred Action Battery

Pollock, J., 2,491,689, Moisture Tester

Went, J. J., 2,491,787, Alloy for Glass to Metal Seal

Otis, A. N., 2,491,828, Continuous Strip Furnace

Tinker, R. B., 2,491,839, Process for Electroplating a Sintered Ferrous Article

Force, J., 2,491,854, Starting Strip for Electric Discharge Devices

Kröger, F. A., and Broos, J., 2,491,865, Process of Preparing Luminescent Magnesium Titanate

Teague, H. M., 2,491,879, Terminal Construction

Schinske, W. G., 2,491,910, Electro Marker

Lazaro, A., 2,491,925, Apparatus for Electroplating

Gifford, C. E., 2,492,095, Production of Silicon Steel Sheet Stock Having High Surface Resistivity and Resistance to Adhesion

December 27, 1949

Van Gilder, R. D., 2,492,204, Electrodeposition of Gold on Tantalum

White, J. C., Baldwin, J. H., Peebles, E. J., and Power, W. H., 2,492,206, Lead Perchloric Acid Primary Cell

Clark, F. M., 2,492,210, Dielectric Composition

Fonda, D. C., 2,492,214, Method of Marking Tungsten Carbide

Bailiff, C. A., 2,492,256, Battery Terminal

Frilette, V. J., 2,492,417 Photochemical Chlorination of Long Chain Compounds

Sloan, H. B., 2,492,665, Thyratron Tube

Sloan, H. B., 2,492,666, Hydrogen-Filled Thyratron

Osman, L. E., 2,492,761, High-Temperature Alloys

Sconce, J. S., Rosenberg, D. S., and Johnson, A. N., 2,492,941, Process for Chlorinating Chlorpropane

January 3, 1950

Lazarus, M., 2,493,076, Argentous Rectifier

Mead, H. G., 2,492,078, Immersion Unit for Radiation Pyrometers

Stareck, J. E., 2,493,092, Method of Electrodepositing Copper and Baths Therefor

Fry, S. S., 2,493,241, Dry Plate Selenium Rectifier

Kirsebom, G. N., 2,493,251, Methods of Introducing Bismuth into Steel or Iron Baths

Casey, J. B., 2,493,389, Battery Cable Terminal

Hammond, M. B., and Bowman, G. B., 2,493,579, Solution for Anodic Polishing of Steel and Iron Articles

Richards, E. A., 2,493,643, Metal Rectifier of the Selenium Type

Boelter, L. M. K., Dunkle, R. V., Gier, J. T., and Martinelli, R. C., 2,493,651, Thermoelectric Heat Flow Responsive Device

January 10, 1950

Waring, C. L., 2,493,934, Production of Protective Coatings on Aluminum and Alloys thereof

Wiegand, C. E., and Segre, E. G., 2,493,935, High-Energy Neutron Counter

Greig, H. G., 2,493,963, Electrolytic Recording

Rogge, R. H., and Roehl, E. J., 2,494,205, Nickel Plating

Ryman, R. C., 2,494,264, Pressure Electrolyzer

Samalion, Y., 2,494,265, Flashlight
Scavullo, A. C., 2,494,266, Cooking Utensil and Method
Bakker, J., 2,494,425, Electrolytically Polished Graphite Anode
Bahney, L. W., and Horswell, A. H., 2,494,501, Submerged Resistor Induction Furnace

January 17, 1950

Nye, W. F., Application 627,080—Primary Cells
Berwick, J. D., 2,494,736, Copper Base Alloy
Moore, W. E., 2,494,775, Arc Electrode Support
MacKenzie, K. W., 2,494,822, Electrical Precipitator
Ray, W. R., 2,494,833, Thermopile and Pilot Burner
Winterhalter, W. E., and Vonada, E. E., 2,494,852, Electric Control
Kröger, F. A., and Voogd, J., 2,494,883, Cascaded Fluorescent Material
Spruance, F. P., Jr., and Thirsk, J. H., 2,494,908, Method of Coating Ferriferous Metals and Zinciferous Metals
Spruance, F. P., Jr., and Thirsk, J. H., 2,494,909, Method of Coating Copper, Brass, Terneplate, Magnesium, Zinciferous and Ferriferous Metals
Spruance, F. P., Jr., 2,494,910, Method of and Composition for Coating Aluminum
Mason, J. F., and Hesch, F. H., 2,494,954, Apparatus for Continuous Anodizing of Sheet Metal
Mendelsohn, S., 2,494,956, Removable Battery Case
Tanberg, R., 2,495,148, Method of Manufacturing Continuous Electrodes

January 24, 1950

Smith, L. N., Application 740,609, Electrodeposition Anode
Friedman, M., 2,495,247, Terminal Construction for Primary Cells
Jacobs, J. H., 2,495,456, Purification of Manganese Solutions; 2,495,457, Method of Treating Cathodes for Electrowinning Manganese
Miller, H. M., 2,495,466, Packaged Magnesium Anode with Cemented Backfill
Chester, A. E., and Reisinger, F. F., 2,495,629, Zinc Electroplating
Willson, K. S., and Ellis, D. G., 2,495,668, Electrodeposition of Copper

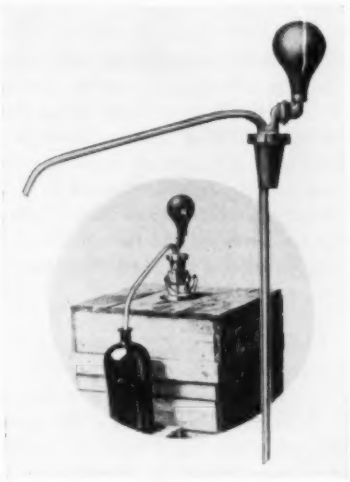
January 31, 1950

Camin, E. L. A., and Kenmore, H., 2,495,695, Electroplating Apparatus
Doschek, A., 2,495,707, Triboelectric Metal Identifier
Girard, J. M., 2,495,716, Rectifier

NOTES FROM INDUSTRY

Products

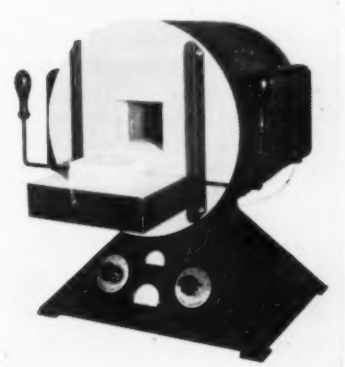
General Scientific Equipment Company has designed a manually-operated acid pump which is finding wide usage wherever liquid must be removed from a carboy, drum, or barrel. Advantages are that corrosive and other liquids flow smoothly, stop instantly, and come in contact only with the corrosion-resistant tube, thereby not affecting other parts. When the pump is removed, acid drains completely. No tilting of the container is necessary and danger of a slip, a splash, or a spill is minimized. Damage likely to result when other methods are used can easily exceed the small cost of the pump. Descriptive literature may be obtained by writing to the General Scientific Equipment Company, 27th and Huntingdon Streets, Philadelphia 32, Pennsylvania.



The Patent Button Company of Waterbury, Connecticut recently announced the development of the Barclay Flame Photometer, an instrument intended for the rapid quantitative determination of sodium and potassium. A product of The Barclay Instruments Division of The Patent Button Company, the Flame Photometer was developed with the close cooperation of scientists familiar with flame photometry, and incorporates features necessary for research and clinical use. The instrument is designed to provide maximum rapidity in making determinations with a high order of accuracy and reproducibility. The principle upon which the method depends is simple and direct. A straightforward d-c circuit is used in the instrument with a sensitive yet rugged portable-type galvanometer as an external null indicator.

Duron, an entirely new and different type of thermo-setting resin used as an acid and alkali-proof cement or coating, is now being produced by The Electro Chemical Supply & Engineering Co., 750 Broad Street, Emmaus, Pennsylvania. Duron will adhere without the use of a primer to concrete or metal, and is self-hardening at room temperature. It is used in the manufacture of acid and alkali-proof cements for joining brick and tile, as a coating for concrete, steel, or wood, and as an impregnant for wood.

Hevi Duty Electric Company has designed a new electric muffle furnace to keep in step with the growing demand for higher temperatures for research in the modern laboratory. The furnace is designed for an operating range of 1700°F to 2600°F, using "Globar" heating elements, and is equipped with a ceramic muffle. Manual control is provided by a tap-changing transformer mounted in the furnace base. "On-off" control is thereby avoided—adding to the element life. Standard equipment includes an ammeter as well as an indicating pyrometer with noble metal thermocouple. The furnace features rapid heating from room temperature and low heat loss. Externally prepared atmospheres may be used without affecting element life. For further information, write Hevi Duty Electric Company, Laboratory Furnace Division, Milwaukee 1, Wisconsin.



General Electric's Control Divisions, Schenectady, offers a new control device which responds to a flow of

cold water to open or close an electrical contact. Called a flow interlock, the device measures approximately 2¼ x 3 x 7 in. In operation it closes a contact when a flow of water exceeds a pre-set amount and opens it when the flow falls below the pre-set amount. It can be used as a safety device in many applications where it is desirable to actuate an electrical contact with a flow of water, as in hot water heaters, welding units, kitchen waste units, transformer cooling, induction heating, television luminaires, water-cooled dynamometers, etc.

DISTILLATION PRODUCTS INDUSTRIES, Rochester, N. Y., has developed a new ionization gauge control circuit, DPA-38, capable of accurately measuring the

highest vacua attainable. It is particularly useful in determining the difficult ranges below 10^{-7} mm Hg. Its lowest scale division represents 2×10^{-7} mm Hg. Its high sensitivity permits use of the entire life of the VG-1A Ionization Gauge Tube with which it works. Other features are a direct-reading scale and a heavy-duty adjustable, automatic relay. It operates on any 110-volt, 60-cycle line.

RINS-AID, a new product for addition, in very small amounts, to a static rinse tank, is announced by R. O. Hull & Company, Inc., Cleveland, Ohio. Rins-Aid is said to form a water-repellent film on freshly plated work, thus leaving the work virtually dry. It is added to the water rinse in the amount of about 10 oz per 100 gal of water, preferably just before the last dip although it may be used in the final rinse. Some advantages of Rins-Aid are: after dip, work is virtually in complete freedom from water staining of chrome, nickel, cadmium, or zinc; imparts an improved appearance to the surface; greater ease of drying; and use of a lower temperature than usual in the final hot water rinse.

Personalties

HUGH C. LAND has been appointed production manager of the Pennsylvania Salt Manufacturing Company it was announced recently. In his new capacity Mr. Land will have general supervision over operation of the manufacturing facilities in the parent company, including utilities.

GENERAL ELECTRIC TRANSFORMER AND ALLIED PRODUCT DIVISIONS at Pittsfield, Mass., have announced the following personnel appointments: Max I. Alimansky, appointed Assistant to the Manager of Engineering; Merritt E. Scoville, Engineer of the Capacitor Divisions, succeeding Mr. Alimansky; Clement E. Sutton, Jr., named Manager of the Distribution Transformer Sales Division; John W. Butler, Manager of the Power Transformer Sales Division, replacing Mr. Sutton; Howard R. Humphrey, Manager of Sales in the General Service Division; and Harold M. Jalonack, Manager of the Marketing and Promotional Service Division.

CALCO CHEMICAL DIVISION, AMERICAN CYANAMID COMPANY, Bound Brook, N. J., has announced the appointment of Quintin T. Dickinson as Manager of the new Coal Tar Chemicals Department, established to handle all purchases and sales of coal tar chemicals and their by-products. Also, W. C. Harmon, Jr., has been named Manager of Purchasing of the Calco Chemical Division.

LEON A. BLUM has been appointed Sales Manager of the San Francisco plant of Federated Metals Division, American Smelting and Refining Company. He succeeds Forest A. Wahlheim, retired. At the same time, Donald H. Beilstein was made Assistant Plant Superintendent. Both assume their new duties immediately.

JOHN E. GURVIN, formerly of Somerville, Massachusetts, has been named plant engineer at the Everett plant of Monsanto Chemical Company's Merrimac Division. Mr. Gurvin also served as president and general manager of Merritt-Monsanto Corporation of Lockport, N. Y., a subsidiary recently sold. The appointment is effective immediately.

ROBERT S. NEBLETT, assistant general manager of the General Electric Company's Nucleonics Department, has been appointed business and construction manager of the Knolls Atomic Power Laboratory. Mr. Neblett, in his new capacity, will handle all business and contractual relations between the laboratory and the Atomic Energy Commission.

EMPLOYMENT SITUATIONS

Please address replies to box shown, c/o The Electrochemical Society Inc., 235 West 102nd Street, New York 25, N. Y.

Positions Wanted

TECHNICAL SERVICE, RESEARCH, OR DEVELOPMENT: B.S. in Ch.E., 1939. Electrochemical experience: quality control, research, development, production, administration. 2½ years industrial electroplating. Dry batteries, 4 years Signal Corps Dev. Labs., 3½ years industrial. Practical mechanic. Desires interesting permanent position with responsibility and advancement. *Reply to Box 337.*

ELECTROCHEMIST: Ph.D. 12 years' broad experience covering research, development, technical supervision in electrodeposition of metals and alloys, electroplating, batteries, theoretical electrochemistry, metal protection, and corrosion. Papers and awards. Can initiate and carry out research program. Desires academic or permanent responsible position. Location immaterial. Available immediately. *Reply to Box 338.*

DRY BATTERY PLANT SUPERINTENDENT, graduate chemical engineer, over 25 years, experience in all aspects of dry battery operations. Until recently associated with one of the largest organizations in the country as plant superintendent. Holds several patents for dry battery products; co-patentee of nationally known dry battery specialty. No preference as to location. *Reply to Box 339.*

METALLURGIST, B.S. (Chem.), postgraduate work in metallurgy. Research and process development experience in the application of leaching, furnace, and electrolytic methods to the recovery of and refining of copper, lead, tin, silver, cadmium, and other nonferrous metals. Experience, metal powders. *Reply to Box 340.*

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